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ICHTHYOFAUNA AND FISH PRODUCTION IN THE POTIASOLA WETLAND OF THE BRAHMAPUTRA BASIN

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ABSTRACT

Investigation on the wetlands was conducted from January 2008 to December 2009. A total of 39 species have been recorded and belonging to17 families during the reporting period. Out of these species 37 species are indigenous species having ornamental values, edible as well as medicinal values while two species are exotic i.e., *Cyprinus carpio carpio* (Lin.) & *Ctenopharyngodon idella.* The wetland was dominated by live fishes and among them, *Clarias batrachus* is a dominant species with 44% and followed by *Channa sp.* with 35% and *Anabas testudineus* with 21%. As per IUCN, out of the recorded species in the *beel*, 2.56% species as Endangered; 10.25% species as Vulnerable (VU); 7.69% species as Lower Rick least concern (LRlc), 38.46% species Near threatened (LRnt), 35.89 species are still Not assessed (NA) and 3% species are expotic. The rate of fish production from the *beel* has been estimated to be an average of 600 kg /yr. (25.65 kg/h).

KEYWORDS: Closed Wetland, Potiasola, *Beel*

INTRODUCTION

Wetlands (beels) are highly productive of the ecosystem. The North Eastern region of India is considered as one of the hot spots of freshwater fish biodiversity in the world (Kottelat & Whitten, 1996). The mixing of drainages and their fish fauna in the geographical past has rendered the Assam Himalayas as very important form faunistic point of view. Most significant contributions on fish diversity and beel ecology are those of Agarwala (1996) in Tamrange wetland; Biswas & Boruah (2000) in lentic and lotic water bodies of upper Brahmaputra basin; Dutta (2002) in "closed" and "open" beels in upper Assam; Bera et al. (2008) in Deepor beel; Singh *et al*., (2009); Dakua et al., (2009); Abujam *et al*. (2011 & 2012) in Maijan beel; Hussain & Biswas (2011) in wetland of Dhemaji; Paswan *et al*. (2012) in Borsala beel of Jorhat. So far 267 fish species belonging to 114 genera under 38 families and 10 orders has been recorded and reported from the region.

This is about 33.13% of total Indian fresh water fishes (Sen, 2000). Sarkar and Poonia (2000) evaluated the ornamental value of 172 fish species occurring in North Eastern Region. As per NBFGR (2002) report among the states, Assam has the largest number of icthyo species (200), followed by Arunachal Pradesh (169), Meghalaya (165), Tripura (134), Manipur (121), Nagaland (68) and Mizoram (48). The status and export potentialities of indigenous ornamental fishes of India were highlighted by some workers (Dey, 1980 & 1982), Sen and Dey (1984), Nath (1986 & 1987) and Tamang (1992). The ornamental fish diversity of the North eastern region of India offers potentialities for its trade in global market. But aquatic fish species are highly threatened species in the North Eastern region as well as in the world due to anthropogenic pressure. Considering the above view, the present study has taken up the fish diversity and its production from Potiasola beel.

MATERIAL AND METHODS

The Potiasola wetland (closed beel) located in the geographical ordinates of $26^0 48^/$-$26^0 49^/$N and $94^0 08^/$-$94^0 10^/$ E. and situated at about 5 km from North east of Jorhat town, Assam. The present investigation was carried out in the beel from January 2008 to December 2009. Fish samples were collected for quarterly basis at the time of catch at the landing site of the *beel*. The fish species were identified with the help of standard procedure of Talwar and Jhingran (1991) and Jayaram (1999). Fish samples were preserved in 5% formalin for further investigation. The individual species was weighed and recorded after collection. Fish yield are estimated by direct observations on catch of individual fishermen (Jhingran and Dutta, 1968) and also with the help of local fishermen and Mohalder having more than 20 years fishing experiences.

RESULTS

Hydro topographic measurement of the Potiasola wetlands is given in Table 1. The area increases up to about 20.00 ha. during rainy season, due to the surrounding low-lying paddy fields, which become an integral part of the beel. Depth increases up to about 6 meters at the season. During dry season, the area decreases up to about 10.00 ha. Depth decreases up to half meter. Altogether 39 species belonging 17 families have been encountered during study period (Table 2). Among the family Cyprinidae was found to be highest species (12) and followed by Belontidae and Channidae with 4 species each and Bagridae,Chandidae, Mastacembelidae, Nandiadae and Siluridae with 2 species each. Some of the indigenous species having ornamental values, edible as well as medicinal values while two species are exotic i.e., *Cyprinus carpio carpio* (Lin.) & *Ctenopharyngodon idella*.

As per IUCN (Table 2), out of the recorded species in the *beel*, 2.56% species as Endangered; 10.25% species as Vulnerable (VU) **(**facing a very high risk of extinction in the wild); 7.69% species as Lower Rick least concern (LRlc), 38.46% species Near threatened (LRnt), 35.89 species are still Not assessed (NA) and 3% species are exotic. The wetland was dominated by live fishes and among them, *Clarias batrachus* is a dominant species with 44% and followed by *Channa sp.* with 35% and *Anabas testudineus* with 21% (Table 3 & 4). Total production was 710 kg during the study period. Out of that 37% production (Table 3) from catfishes followed by murrels (29%), miscellaneous (18%) including *Anabus testudineus*, feather back (8%), carps (5 %) and exotic sp. (3 %).

DISCUSSIONS

Wetlands are the creation of the river Brahmaputra in the flood plain area. Water level of the Potiasola beel is dependent upon the rainwater from surrounding paddy fields and connecting channel. Interestingly two exotic species were also encountered in the open beel. This investigation reveals that there has been drastic reduction in the abundance and distribution range of fishes in North East region due to habitat modification, overexploitation and other anthropogenic pressure (Deka *et al.* 2005). The International Union for Conservation of Nature and Natural Resources (IUCN) has categorized the conservation status of the recorded fish species.The highest percentage was found to be LRnt & NA category and followed by VU, LRlc, and EN category respectively (Figure 1). Out of that 37% production from catfishes followed murreles, miscelleneous including *Anabus testudineus*, feather back, carps and exotic sp. (Figure 2).The *beel* was dominated by live fishes than carps species and among them, *Clarias batrachus* is a dominant species and next followed by *Channa sp.* and *Anabas testudineus* (Figure 3). Similar record was observed by Bordoloi (2010). Family Cyprinidae have highest species and followed by Belontidae and Channidae. Similar observation was reported by Singh (2009); Dakua (2009) and Abujam (2012). Most of them have ornamental, edible values as well as medicinal values. These fishes also

have high price and demand in the local market. So, these fishes should be conserved and develop breeding technique in-situ and ex-situ condition.

Fish Production

On the basis of questionnaire, annual fish yield of the wetland was estimated about 25.5 kg/ha. The Central Inland Fisheries Research Institute, Barrackpore has estimated yields varying from 14 to 488 kg/ha/year. Average yields of 17 *beel*s in the Brahmaputra valley is 134 kg/ha/year, compared to 285 kg/ha in 6 *beel*s of the Barak valley (Sugunan and Sinha, 2000). The average yield of 23 *beel*s in Assam across the districts is 173 kg/ha (Sugunan and Sinha, 2000). The present finding was found to be low in comparison to the other findings. Ecological degradation is the most important factor for fish declining. The ecological degradation of the beels started with the arrival of the water hyacinth a century ago. Rampant growth of this fast – growing weed obstructs the penetration of sunlight, inhibiting plank tonic growth and contributing to eutrophication by slowing down water currents and depositing debris at the bottom. The second phase of enhanced eutrophication resulted from the construction of embankments along almost the entire length of the river Brahmaputra and many of its tributaries after the devastating earthquake of 1950. The final onslaught on the wetlands has been from human activities such as buffalo and cattle rearing, agriculture and horticulture, and over fishing. These have resulted in further siltation and damage to the micro flora and water quality. The injudicious use of pesticides in farming activities has resulted in the accumulation of residue through surface runoff, leading to the problem of biomagnification. A number of fish species, such as *Puntius jerdoni*, *Bagarius bagrius* and *Semiplotus semiplotus* are on the verge of extinction (Dubey and Ahmed 1950). The use of unauthorized mesh size and use of a wide range of non – selective fishing gears such as mosquito nets in this state indicates that most fishers do not comply with the existing fishery act and fishing regulations and are not concerned with possible overexploitation of the stocks of commercially important species.

Table 1: Hydrotopograghic Measurement of the Closed Wetlands

Parameters	Measurement
Area at Full Storage Level (ha)	20
Area at Dead Storage Level (ha)	10.25
Total volume at FSL m3)	31729.62
Total volume at DSL m3)	15864.81
Maximum length at FSL (m)	1000
Maximum width at FSL (m)	450
Maximum length at DSL (m)	450
Maximum width at DSL (m)	210
Maximum depth at FSL (m)	6
Minimum depth at FSL (m)	0.25
Mean depth (Dm) at FSL (m)	4.54
Maximum depth at DSL (m)	2.10
Minimum depth at DSL (m)	0.20
Mean depth (Dm) at DSL (m)	0.25
Volume development (VD) at FSL)	3.96
Volume development (VD) at DSL	0.25

Table 2: Status of the Recorded Fish Species of the Potiasola *Beel*

Family	Species	Status(IUCN)	Economic Importance
1. Anabantidae	1. *Anabas testudineus* (Ham.)	VU	Edible, Medicinal value, Aquarium species
2. Belontidae	1.*Trichogaster fasciata*	NA	Edible, Aquarium species
	2. *T. labiosa*	NA	Edible, Aquarium species

Table 2: Contd.,

	3. *T. lalia*	NA	Edible, Aquarium species
	4. *T. sota*	NA	Edible, Aquarium species
3. Belonidae	1. *Xenentodon cancila* (Ham.)	LR-nt	Edible, Aquarium species
4. Bagridae	1. *Mystus cavasius* (Ham.)	LR-nt	Edible, Aquarium species
	2. *M. tengra* (Ham.)	NA	Edible, Aquarium species
5.Chandidae	1. *Chanda nama* (Ham.)	NA	Edible, Aquarium species
	2. *Parambassis ranga* (Ham.)	NA	Edible, Aquarium species
6. Clariidae	1. *Clarius batrachus* (Linn.)	VU	Edible, Medicinal value Aquarium species
7. Cobitidae	1. *Botia dario* (Ham.)	NA	Edible, Aquarium species
8. Cyprinidae	1. *Amblypharyngodon mola* (Ham.)	R-lc	Edible, Aquarium species
	2. *Cyprinus carpio carpio* (Lin.)		Edible,
	3. *Chela apter* (Ham).	NA	Edible, Aquarium species
	4. *Cirrhinus mrigala* (Ham).	LR-nt	Edible
	5. *Labeo bata*	LR-nt	Edible
	6. *Labeo gonius* (Ham).	LR-nt	Edible
	7. *Puntius chola* (Ham.)	VU	Edible, Aquarium species
	8. *Puntius gelius* (Ham.)	NAS	Aquarium species
	9. *P. sophore* (Ham.)	LR-nt	Edible, Aquarium species
	10. *P. ticto* (Ham)	LR-nt	Edible Aquarium species
	11. *Rasbora daniconius* (ham.).	NA	Edible, Aquarium species
	12. *Ctenopharyngodon idella*	Exotic	Edible
9. Channidae	1. *Channa gachua* (Ham.-Bloch.)	NA	Edible, Aquarium species
	2. *C. marulius* (Ham.)	LR-nt	Edible, Aquarium species
	3. *C. punctatus* (Bloch.)	LR-nt	Edible, Aquarium species
	4. *C. striata* (Bloch.)	LR-lc	Edible, Aquarium species
10. Clupeidae	1. *Gudusia chapra* (Ham)	LR-lc	Edible Aquarium species
11. Heteropneustidae	1. *Heteropneustes fossilis* (Bloch)	VU	Edible, Medicinal value, Aquarium species
12. Mastacembelidae	1. *Mastacembelus armatus* (Lacepede)	LR-nt	Edible Aquarium species
	2. *Macrognathus pancalus* (Ham)	LR-nt	Edible Aquarium species
13. Nandidae	1. *Nandus nandus* (Ham)	LT-nt	Edible, Aquarium species
	2. *Badis badis*	NA	Edible, Aquarium species
14. Notopteridae	1. *Notopterus notopterus*	LR-nt	Edible Aquarium fish
15. Siluridae	1. *Ompok pabda* (Ham)	EN	Edible, Aquarium fish
	2. *Ompok pabo* (Ham)	NA	Edible, Aquarium fish
16. Synbranchidae	1. *Monopterus cuchia* (Ham)	LR-nt	Edible, Aquarium species
17. Tetraodontidae	1. *Tetraodon cutcutia* (Ham)	LR-nt	Edible, Aquarium species

Table 3: Monthly Fish Catch Statistics (Kg) in Potiasola Wetlands

2008 -09	J	F	M	A	M	J	J	A	S	O	N	D	SUM	MEAN
CAT FISH	2	2	5	2	3	4	20	20	40	40	60	60	258	39.69
MURREL	5	9	6	8	20	10	10	20	30	20	40	30	208	32
FEATHERBACK	0	0	1	0	5	5	5	9	5	10	10	5	55	8.462
MISCELLENEOUS INCLUDING ANABUS SPECIES	1	5	6	8	10	10	10	10	10	20	20	20	130	20
CARP	0	0	0	0	3	5	2	10	5	2	5	5	37	5.692
Carp (exotic)	0	0	0	o	2	3	1	2	3	3	3	5	22	3.667
TOTAL													**710**	**710**

Table 4: Production of Live Fishes in the Potiasola Wetlands

Live Fishes	Production (Kg)	%
Clarias batrachus &Heteropneuses fossilis	258	44.02
Anabus testudineus	120	20.47
Channa sp.	208	35.49
Total	**586**	

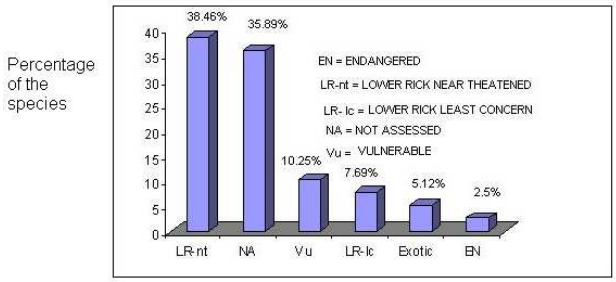

Figure 1: Status of Fishers in the Potiasola Wetland

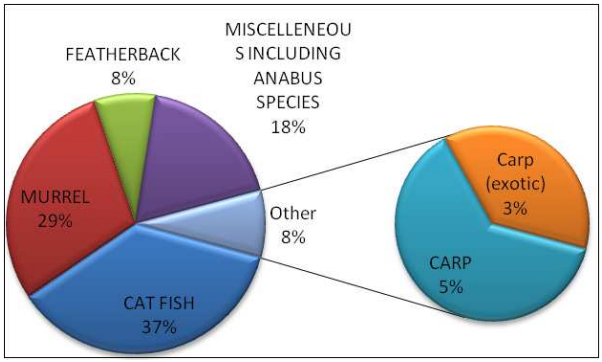

Figure 2: Fish Composition in the Potiasola Wetland

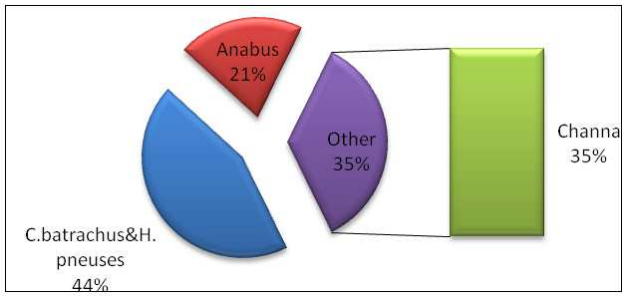

Figure 3: Percentage of Live Fishes in the Potiasola Wetlands during Study

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